

## ABSTRACT

5     **PARTICULATE REINFORCED ALUMINUM-BASED COMPOSITES, THEIR**  
      **COMPONENTS AND THE NEAR NET SHAPE FORMING PROCESS OF**  
          **THE COMPONENTS**

      This invention concerns particulate reinforced Al-based composites, and the  
near net shape forming process of their components. The average size of the  
10   reinforced particle in the invented composites is  $0.1\sim 3.5\mu\text{m}$  and the volume  
percentage is  $10 \sim 40\%$ , and a good interfacial bonding between the  
reinforced particulate and the matrix is formed with the reinforced particles  
uniformly distributed. The production method of its billet is to have the  
reinforced particles and Al-base alloy powder receive variable-speed high-  
15   energy ball-milling in the balling drum. Then, with addition of a liquid  
surfactant, the ball-mill proceeds to carry on ball-milling. After the ball-milling,  
the produced composite powder undergoes cold isostatic pressing and the  
subsequent vacuum sintering or vacuum hot-pressing to be shaped into a hot  
compressed billet, which in turn undergoes semisolid thixotropic forming and  
20   may be shaped into complex-shaped components. These components can be  
used in various fields. This product is featured with excellent property, good  
machinability, stable quality, component near net shape forming and cost  
effective and higher performance.

25   (Figure 5)